

Amendments to the Claims

Please amend Claims 1, 7, 8, 15, 28-31. Please add new Claims 33-61. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

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1. (Currently Amended) A master station of a master/slave surgery system, adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:
 - a lower positioner assembly;
 - an upper positioner assembly supported over said lower positioner assembly and rotational relative to said lower positioner assembly to enable lateral side-to-side surgeon manipulation; and
 - an arm assembly including an elongated arm member, and having a ~~hard~~ hand assembly at its distal end for engagement by the surgeon's hand, and a proximal end pivotally supported from said upper positioner assembly to enable an orthogonal forward-and-back surgeon manipulation in a direction substantially orthogonal to the lateral surgeon manipulation;
 - said assemblies being disposed remote from said slave station and to the side of the operator so that the arm member extends in a direction along at least a portion of the operators arm.
 2. (Original) A master station as claimed in claim 1 wherein said arm assembly includes a proximal arm member and a distal arm member coupled by a rotational joint.
 3. (Original) A master station as claimed in claim 2 including a position encoder at said rotational joint to detect rotation of the distal arm member.

4. (Original) A master station as claimed in claim 3 including a pivotal joint connecting said hand assembly to a distal end of said distal arm member.
5. (Original) A master station as claimed in claim 4 including a position encoder at said pivotal joint to detect pivoting of the hand assembly.
6. (Original) A master station as claimed in claim 5 wherein said hand assembly includes a base piece and a pair of holders coupled from said base piece.
- 03 7. (Currently Amended) A master station ~~as claimed in claim 6~~ of a master/slave surgery system, adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:
a lower positioner assembly;
an upper positioner assembly supported over said lower positioner assembly and rotational relative to said lower positioner assembly to enable lateral side-to-side surgeon manipulation; and
an arm assembly having a hand assembly at its distal end for engagement by the surgeon's hand, and a proximal end pivotally supported from said upper positioner assembly to enable an orthogonal forward-and-back surgeon manipulation in a direction substantially orthogonal to the lateral surgeon manipulation;
wherein said arm assembly includes a proximal arm member and a distal arm member coupled by a rotational joint;
including a position encoder at said rotational joint to detect rotation of the distal arm member;
including a pivotal joint connecting said hand assembly to a distal end of said distal arm member;
including a position encoder at said pivotal joint to detect pivoting of the hand assembly;

wherein said hand assembly includes a base piece and a pair of holders coupled from said base piece;

wherein one of said holders is adapted to receive a thumb and the other holder is adapted to receive a forefinger.

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8. (Currently Amended) A master station as claimed in claim 7 wherein said holders each comprise a metal bar and a ~~Velcro~~ fibrous loop material.
 9. (Original) A master station as claimed in claim 7 wherein said hand assembly further includes a pair of rotating elements pivotally supported from opposite ends of said base piece.
 10. (Original) A master station as claimed in claim 9 wherein one of said holders is secured to one of said rotating elements so that the surgeon can move said one holder toward and away from the other holder.
 11. (Original) A master station as claimed in claim 10 wherein the pivotal joint that connects the hand assembly to the distal end of the distal arm member is connected to the other rotating element of the pair of rotating elements.
 12. (Original) A master station as claimed in claim 10 including a position encoder at each of said pair of rotating elements.
 13. (Original) A master station as claimed in claim 1 including a pivotal joint connecting the hand assembly to a distal end of the arm assembly.
 14. (Original) A master station as claimed in claim 13 wherein said hand assembly includes a base piece and a pair of holders coupled from said base piece.

15. (Currently amended) A master station ~~as claimed in claim 14~~ of a master/slave surgery system, adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:
- a lower positioner assembly;
 - an upper positioner assembly supported over said lower positioner assembly and rotational relative to said lower positioner assembly to enable lateral side-to-side surgeon manipulation; and
 - an arm assembly having a hand assembly at its distal end for engagement by the surgeon's hand, and a proximal end pivotally supported from said upper positioner assembly to enable an orthogonal forward-and-back surgeon manipulation in a direction substantially orthogonal to the lateral surgeon manipulation;
 - including a pivotal joint connecting the hand assembly to a distal end of the arm assembly;
 - wherein said hand assembly includes a base piece and a pair of holders coupled from said base piece;
 - wherein one of said holders is adapted to receive a thumb and the other holder is adapted to receive a forefinger.
16. (Original) A master station as claimed in claim 15 wherein said hand assembly further includes a pair of rotating elements pivotally supported from opposite ends of said base piece.
17. (Original) A master station as claimed in claim 16 wherein one of said other holders is secured to one of said rotating elements so that the surgeon can move said one holder toward and away from the other holder.
18. (Original) A master station is claimed in claim 17 wherein the pivotal joint that connects the hand assembly to the distal end of the arm assembly is connected to the other rotating element of the pair of rotating elements.

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19. (Original) A master station as claimed in claim 2 wherein said proximal arm member comprises a pair of parallel-disposed arms and a pair of support pieces for the arms, each of the arms being pivotally supported at respective ends thereof in said support pieces.
 20. (Original) A master station as claimed in claim 19 wherein one of said support pieces forms part of said rotational joint between the proximal and distal arm members.
 21. (Original) A master station as claimed in claim 20 wherein the other of said support pieces forms part of said pivotal support of said proximal end of said arm assembly about said lower positioner assembly.
 22. (Original) A master station as claimed in claim 21 including a counter-weight on said other support piece.
 23. (Original) A master station as claimed in claim 1 wherein the lower positioner assembly includes a motor and encoder.
 24. (Original) A master station as claimed in claim 1 wherein the upper positioner assembly includes a substantially upright frame rotational relative to the lower positioner assembly, said substantially horizontal axis disposed at a top of said upright frame.
 25. (Original) A master station as claimed in claim 24 wherein an upper shaft supported from said frame establishes said horizontal axis, and further including a second horizontal shaft below said upper shaft.
 26. (Original) A master station as claimed in claim 25 including a belt and pulley arrangement for intercoupling said shafts.

27. (Original) A master station as claimed in claim 26 including position encoders engaged with said lower shaft.
28. (Currently Amended) A master station of a master/slave surgery system adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:
- a base pair of bases remote from said slave station, each said base supporting;
 - an arm assembly pivotally supported from the base and including an elongated arm; and
 - a hand assembly pivotally supported from said arm assembly;
 - said hand assembly including a finger ~~holder~~ receiver and a thumb ~~holder~~ receiver, and wherein said ~~holders~~ receivers are supported for relative movement therebetween;
 - said pair of bases being disposed, respectively, on opposite sides of the operator so as to, in operation, position said respective elongated arms adjacent to and alongside of a substantial length of the operators arm.
29. (Currently Amended) A master station as in claim 28, wherein said hand assembly also includes a base piece for said ~~holders~~ receivers.
30. (Currently Amended) A master station as in claim 29, wherein said thumb ~~holder~~ receiver is fixed in position relative to said base piece and said finger ~~holder~~ receiver rotates from said base piece.
31. (Currently Amended) A master station of a master/slave surgery system adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:
- a base;

an arm assembly pivotally supported from the base; and

a hand assembly pivotally supported from said arm assembly;

said hand assembly including a guide shaft adapted to be grasped by the surgeon for controlling replicated motion at the slave station, an actuator button or switch on said guide shaft controlled by the surgeon and for control of one or more functions of the system, and a multiple rotation joint connecting said guide shaft to said arm assembly.

32. (Withdrawn) In a surgical instrument system having an instrument that is adapted to be inserted through an incision point into the patient for positioning a distal end of the instrument at an operative site within the patient, the system being adapted for operation by a surgeon from outside the patient, wherein the system includes a slave station having a support for the surgical instrument, the improvement comprising;

a template secured to the support for locating the position of said support, and subsequently said surgical instrument, relative to the incision point of the patient.

33. (New) A master input interface where a medical practitioner can robotically control a separately disposed surgical instrument, and in accordance with manipulations by the medical practitioner at an input interface device, said master input interface comprising:

a base;

an arm assembly supported from said base and with said base adapted to transfer at least two degrees of freedom of motion to said surgical instrument; and

a hand assembly that is pivotally coupled with said arm assembly about a pivot axis, the motion about which provides another degree of freedom of motion to said surgical instrument;

said hand assembly including a base piece and a pair of holders coupled from said base piece wherein one of said holders is adapted to receive a thumb and the other holder is adapted to receive a forefinger.

34. (New) A master station as claimed in claim 33 wherein said hand assembly further includes a pair of rotating elements pivotally supported from opposite ends of said base piece.
35. (New) A master station as claimed in claim 34 wherein one of said holders is secured to one of said rotating elements so that the surgeon can move said one holder toward and away from the other holder.
36. (New) A master station as claimed in claim 35 wherein the pivotal joint that connects the hand assembly to the arm assembly is connected to the other rotating element of the pair of rotating elements.
37. (New) A master station manipulated by an operator for robotic control of a medical instrument disposed at a slave station, said master station comprising:
- a base;
 - an arm assembly including at least one elongated arm member, supported from said base and with said base adapted to transfer at least two motion actuations to said medical instrument; and
 - a hand assembly that is pivotally coupled with said arm assembly about a pivot axis, the motion about which provides another motion actuation to said medical instrument;
- said base being disposed remote from the medical instrument, and to the side of the operator, and constructed and arranged so that the arm member, in operation, extends in a direction substantially parallel to and alongside at least a portion of the operators arm.
38. (New) A master station as claimed in claim 37 wherein said arm member is disposed so that the pivot axis is coincident with the operators wrist.

39. (New) A master station as claimed in claim 37 including a pair of bases and associated pair of arm assemblies and hand assemblies with a base being disposed on either side and lateral of said operator.
40. (New) A master station manipulated by an operator for robotic control of a medical instrument disposed at a slave station, said master station comprising:
- a base;
 - an arm assembly including at least one elongated arm member, supported from said base and adapted to transfer at least one motion actuation to said medical instrument;
 - and
 - a hand assembly that is coupled with said arm assembly defined by multiple pivot axes that include:
 - a first pivot axis from which a distal control member is disposed the motion about which provides another motion actuation to said medical instrument,
 - a second pivot axis proximal of said first pivot axis the motion about which provides still another motion actuation to said medical instrument,
 - and a third pivot axis spaced from and proximal of said second pivot axis the motion about which provides yet another motion actuation to said medical instrument.
41. (New) A master station as claimed in claim 40 wherein said third pivot axis is substantially transverse to said second pivot axis.
42. (New) A master station as claimed in claim 40 wherein said distal control member includes a base piece and a pair of holders coupled from said base piece, one of said holders being adapted to receive a thumb and the other holder adapted to receive a forefinger.
43. (New) A master station as claimed in claim 40 wherein said third pivot axis is coupled to the distal end of said elongated arm member.

44. (New) A master station as claimed in claim 40 wherein said elongated arm member, in operation, extends in a direction substantially parallel to and alongside at least a portion of the operators arm.
45. (New) A master station as claimed in claim 40 wherein the first and second pivot axes extend in the same direction.
46. (New) A master station as claimed in claim 40 wherein said elongated arm member is disposed so that at least the third pivot axis is coincident with the operators wrist.
47. (New) A master station as claimed in claim 40 including a pair of bases and associated pair of arm assemblies and hand assemblies with a base being disposed on either side and lateral of said operator.
48. (New) A method of having a medical practitioner operate a master controller so as to robotically control a medical instrument used on a patient that is located on a patient support member, said method comprising the steps of:
- providing a hand piece that is supported from an elongated arm member that is, in turn, supported from a base of the master controller;
 - disposing the base of the master controller away from the patient support member, and laterally to the side of an assumed operative position of the medical practitioner;
 - having the hand of the medical practitioner grasp the hand piece while the elongated arm member extends in a direction that is substantially parallel to and alongside of the arm of the medical practitioner; and
 - controlling the movement of the medical instrument by manipulation of at least said hand piece.
49. (New) A method as claimed in claim 48 including providing a tool at the distal end of the elongated arm member, and controlling the movement of the tool by manipulation of a pair of holders of the hand piece.

50. (New) A method as claimed in claim 48 wherein during the grasping step the elongated arm member is adjacent in position to the arm of the medical practitioner.

51. (New) A method as claimed in claim 50 including providing a pivot joint between the elongated arm member and the hand piece, and wherein the pivot joint coincides in position with the wrist of the medical practitioner.

52. (New) A master station manipulated by an operator for robotic control of a medical instrument disposed at a slave station, said master station comprising:

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a first base disposed remote from an operating table upon which a subject, that is to have a medical procedure performed thereon, is located;

a first arm assembly including at least one elongated arm member, supported from said first base and with said base adapted to transfer at least two motion actuations to a first medical instrument;

a first hand assembly that is pivotally coupled with said first arm assembly about a pivot axis, the motion about which provides another motion actuation to said first medical instrument;

a second base disposed remote from an operating table upon which a subject, that is to have a medical procedure performed thereon, is located;

a second arm assembly including at least one elongated arm member, supported from said second base and with said base adapted to transfer at least two motion actuations to a second medical instrument; and

a second hand assembly that is pivotally coupled with said second arm assembly about a pivot axis, the motion about which provides another motion actuation to said second medical instrument;

said first and second bases being disposed, respectively, on opposite sides of the operator and commonly attached to a support for the operator.

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53. (New) A master station as claimed in claim 52 wherein each arm assembly comprises at least one arm member, supported from its corresponding base and adapted to transfer at least one motion actuation to its associated medical instrument.
54. (New) A master station as claimed in claim 53 wherein each hand assembly is pivotally coupled with its corresponding arm assembly about a first pivot axis, the motion about which provides another motion actuation to its associated medical instrument, and each hand assembly further having a second pivot axis spaced from said first pivot axis, the motion about which provides still another motion actuation to its associated medical instrument.
55. (New) A master station as claimed in claim 54 wherein said second axis is substantially transverse to said first axis, and further including a third pivot axis from which a distal control member is disposed the motion about which provides another motion actuation to said medical instrument.
56. (New) A master station as claimed in claim 52 wherein each hand assembly further includes a base piece and a pair of holders coupled from said base piece.
57. (New) A master station as claimed in claim 56 wherein one of said holders is adapted to receive a thumb and the other holder is adapted to receive a finger.
58. (New) A master station as claimed in claim 52 wherein each base is disposed to the side of the operator so that the arm member extends substantially along at least a portion of the operators arm.
59. (New) A master station as claimed in claim 59 wherein said arm member is disposed so that the pivot axis between the arm assembly and the hand assembly is coincident with the operators wrist.

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61. (New) A master station as claimed in claim 61 wherein said support comprises a bracket that extends between sides of the seat.
